

CLAIMS

What is claimed is:

1. An assembly for use in making a fiber-reinforced composite article according to a method wherein an uncured resin having a given viscosity is infused into a fibrous body to form an uncured resin impregnated fibrous body that is then cured to form said fiber-reinforced composite article, said assembly comprising:

a mold comprising a surface having a first location and a second location;

a fibrous body having a side that is located adjacent to the surface of said mold wherein said side of the fibrous body extends from said first location to said second location; and

an immobilization agent associated with said fibrous body, said immobilization agent being located between said first and second locations and being present in a sufficient amount to increase the viscosity of at least a portion of the infused resin to form an immobilized resin barrier, said resin barrier being sufficiently large to restrict the flow of said resin between said first and second locations.

2. The assembly for use in making a fiber-reinforced composite article according to claim 1 wherein said immobilization agent comprises an accelerator agent.

3. The assembly for use in making a fiber-reinforced composite article according to claim 1 wherein said immobilization agent comprises a thixotropic agent.

4. The assembly for use in making a fiber-reinforced composite article according to claim 2 wherein said immobilization agent comprises a thixotropic agent.

5. The assembly for use in making a fiber-reinforced composite article according to claim 1 wherein said immobilization agent comprises a carrier substrate that is impregnated with an accelerator agent and/or said thixotropic agent.

6. The assembly for use in making a fiber-reinforced composite article according to claim 5 wherein said carrier substrate comprises a plurality of fibers.

7. The assembly for use in making a fiber-reinforced composite article according to claim 1 wherein said immobilization agent is located at spaced locations so as to provide a plurality of immobilized resin barriers.

8. The assembly for use in making a fiber-reinforced composite article according to claim 1 wherein said immobilization agent is located at spaced locations so as to provide a single immobilized resin barrier.

9. The assembly for use in making a fiber-reinforced composite article according to claim 1 wherein said fibrous body comprises at least two layers of fibers and wherein said immobilization agent is located in some or all of said layers of fibers.

10. The assembly for use in making a fiber-reinforced composite article according to claim 5 wherein said fibrous body comprises at least two layers of fibers and wherein said immobilization agent is located between some or all of said layers of fibers.

11. The assembly for use in making a fiber-reinforced composite article according to claim 1 wherein said mold comprises a resin outlet through which resin can flow from said fibrous body and wherein said immobilization agent is also located adjacent said resin outlet so as to restrict flow of resin through said outlet when said immobilized resin barrier is formed.

12. An assembly for use in making a fiber-reinforced composite article according to a method wherein an uncured resin having a given viscosity is infused into a fibrous body to form an uncured resin impregnated fibrous body that is then cured to form said fiber-reinforced composite article, said assembly comprising:

- a mold comprising a surface including an outlet through which resin from said uncured resin impregnated fibrous body can flow;

- a fibrous body having a side that is located adjacent to the surface of said mold at said outlet;

- an immobilization agent associated with said fibrous body, said immobilization agent being present in a sufficient amount to increase the viscosity of at least a portion of the infused resin to form an immobilized resin barrier, said resin barrier being sufficiently large and located sufficiently close to said outlet to restrict the flow of said resin through said outlet.

13. An assembly for use in making a fiber-reinforced composite article according to a method wherein an uncured resin having a given viscosity is infused into a fibrous body to form an uncured resin impregnated fibrous body that is then cured to form said fiber-reinforced composite article, said assembly comprising:

a mold comprising a surface having a first location and a second location;

a fibrous body having a side that is located adjacent to the surface of said mold wherein said side of the fibrous body extends from said first location to said second location;

resin that has been infused into said fibrous body, said resin being located at both said first and second locations;

an immobilized resin barrier, said resin barrier being sufficiently large to restrict the flow of said resin between said first and second locations, said immobilized resin barrier being formed by contacting said resin with an immobilization agent during infusion of said resin into said fibrous body.

14. The assembly for use in making a fiber-reinforced composite article according to claim 13 wherein said immobilization agent comprises an accelerator agent.

15. The assembly for use in making a fiber-reinforced composite article according to claim 13 wherein said immobilization agent comprises a thixotropic agent.

16. The assembly for use in making a fiber-reinforced composite article according to claim 14 wherein said immobilization agent comprises a thixotropic agent.

17. The assembly for use in making a fiber-reinforced composite article according to claim 13 wherein said immobilization agent comprises a carrier substrate that is impregnated with an accelerator agent and/or said thixotropic agent.

18. The assembly for use in making a fiber-reinforced composite article according to claim 17 wherein said carrier substrate comprises a plurality of fibers.

19. The assembly for use in making a fiber-reinforced composite article according to claim 13 wherein said fibrous body comprises at least two layers of fibers and wherein said immobilization agent is located in some or all of said layers of fibers.

20. The assembly for use in making a fiber-reinforced composite article according to claim 17 wherein said fibrous body comprises at least two layers of fibers and wherein said immobilization agent is located between some or all of said layers of fibers.

21. The assembly for use in making a fiber-reinforced composite article according to claim 13 that comprises a plurality of immobilized resin barriers.

22. The assembly for use in making a fiber-reinforced composite article according to claim 21 wherein said mold comprises a resin outlet through which resin can flow from said fibrous body and wherein said immobilized resin barrier is located sufficiently close to said outlet to restrict the flow of said resin through said outlet.

23. An assembly for use in making a fiber-reinforced composite article according to a method wherein an uncured resin having a given viscosity is infused into a fibrous body to form an uncured resin impregnated fibrous body that is then cured to form said fiber-reinforced composite article, said assembly comprising:

a mold comprising a surface including an outlet;

a fibrous body having a side that is located adjacent to the surface of said mold at said outlet;

resin that has been infused into said fibrous body, said resin being located at said outlet

an immobilized resin barrier located adjacent to said outlet, said resin barrier being sufficiently large to restrict the flow of said resin to said outlet, said immobilized resin barrier being formed by contacting said resin with an immobilization agent during infusion of said resin into said fibrous body.

24. A method for making an assembly for use in making a fiber-reinforced composite article according to a method wherein an uncured resin having a given viscosity is infused into a

fibrous body to form an uncured resin impregnated fibrous body that is then cured to form said fiber-reinforced composite article, said method comprising the steps of:

providing a mold comprising a surface having a first location and a second location;

providing a fibrous body having a side that is located adjacent to the surface of said mold wherein said side of the fibrous body extends from said first location to said second location; and

associating an immobilization agent with said fibrous body, said immobilization agent being located between said first and second locations and being present in a sufficient amount to increase the viscosity of at least a portion of the infused resin to form an immobilized resin barrier, said resin barrier being sufficiently large to restrict the flow of said resin between said first and second locations.

25. The method for making an assembly for use in making a fiber-reinforced composite article according to claim 24 wherein said immobilization agent comprises an accelerator agent.

26. The method for making an assembly for use in making a fiber-reinforced composite article according to claim 24 wherein said immobilization agent comprises a thixotropic agent.

27. The method for making an assembly for use in making a fiber-reinforced composite article according to claim 25 wherein said immobilization agent comprises a thixotropic agent.

28. The method for making an assembly for use in making a fiber-reinforced composite article according to claim 24 wherein said immobilization agent comprises a carrier substrate that is impregnated with an accelerator agent and/or said thixotropic agent.

29. The method for making an assembly for use in making a fiber-reinforced composite article according to claim 28 wherein said carrier substrate comprises a plurality of fibers.

30. The method for making an assembly for use in making a fiber-reinforced composite article according to claim 24 wherein said immobilization agent is located at spaced locations so as to provide a plurality of immobilized resin barriers.

31. The method for making an assembly for use in making a fiber-reinforced composite article according to claim 24 wherein said immobilization agent is located at spaced locations so as to provide a single immobilized resin barrier.

32. The method for making an assembly for use in making a fiber-reinforced composite article according to claim 24 wherein said fibrous body comprises at least two layers of fibers and wherein said immobilization agent is located in some or all of said layers of fibers.

33. The method for making an assembly for use in making a fiber-reinforced composite article according to claim 28 wherein said fibrous body comprises at least two layers of fibers and wherein said immobilization agent is located between some or all of said layers of fibers.

34. The method for making an assembly for use in making a fiber-reinforced composite article according to claim 24 wherein said mold comprises a resin outlet through which resin can flow from said fibrous body and wherein said step of associating immobilization agent with said fibrous body includes locating said immobilization agent adjacent said resin outlet so as to restrict flow of resin through said outlet when said immobilized resin barrier is formed.

35. A method for making an assembly for use in making a fiber-reinforced composite article according to a method wherein an uncured resin having a given viscosity is infused into a fibrous body to form an uncured resin impregnated fibrous body that is then cured to form said fiber-reinforced composite article, said method comprising the steps of:

providing a mold comprising a surface including an outlet through which resin from said uncured resin impregnated fibrous body can flow;

providing a fibrous body having a side that is located adjacent to the surface of said mold at said outlet;

associating an immobilization agent with said fibrous body adjacent to said outlet, said immobilization agent being present in a sufficient amount to increase the viscosity of at least a portion of the infused resin to form an immobilized resin barrier, said resin barrier being sufficiently large and located sufficiently close to said outlet to restrict the flow of said resin through said outlet.

36. The method for making an assembly for use in making a fiber-reinforced composite article according to claim 24 that includes the additional step of infusing said resin into said fibrous body so that said resin is located at said first and second locations.

37. The method for making an assembly for use in making a fiber-reinforced composite article according to claim 36 that includes the additional step of curing said infused resin.

38. The method for making an assembly for use in making a fiber-reinforced composite article according to claim 35 that includes the additional step of infusing said resin into said fibrous body so that said resin is located adjacent to said outlet.

39. The method for making an assembly for use in making a fiber-reinforced composite article according to claim 38 that includes the additional step of curing said infused resin.

40. The assembly for use in making a fiber-reinforced composite article according to claim 13 wherein said resin comprises an epoxy resin and a curing agent.

41. The assembly for use in making a fiber-reinforced composite article according to claim 23 wherein said resin comprises an epoxy resin and a curing agent.

42. The method for making an assembly for use in making a fiber-reinforced composite article according to claim 36 wherein said resin comprises an epoxy resin and a curing agent.

43. The method for making an assembly for use in making a fiber-reinforced composite article according to claim 38 wherein said resin comprises an epoxy resin and a curing agent.

44. In an assembly for use in making a fiber-reinforced composite article according to a method wherein an uncured resin having a given viscosity is infused into a fibrous body to form an uncured resin impregnated fibrous body that is then cured to form said fiber-reinforced composite article, the improvement comprising controlling the flow of said resin within said fibrous body by introducing an immobilization agent into said fibrous body at one or more selected locations, said immobilization agent being present in a sufficient amount at said one or more selected locations to increase the viscosity of at least a portion of the infused resin to form one or more immobilized resin

barriers, said resin barriers being sufficiently large to restrict the flow of said resin within said fibrous body.

45. In a method for making a fiber-reinforced composite article wherein an uncured resin having a given viscosity is infused into a fibrous body to form an uncured resin impregnated fibrous body that is then cured to form said fiber-reinforced composite article, the improvement comprising controlling the flow of said resin within said fibrous body by introducing an immobilization agent into said fibrous body at one or more selected locations, said immobilization agent being present in a sufficient amount at said one or more selected locations to increase the viscosity of at least a portion of the infused resin to form one or more immobilized resin barriers, said resin barriers being sufficiently large to restrict the flow of said resin within said fibrous body.